

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
3 February 2005 (03.02.2005)

PCT

(10) International Publication Number
WO 2005/011030 A1

(51) International Patent Classification⁷: **H01M 4/36**

(21) International Application Number:
PCT/KR2004/001914

(22) International Filing Date: 29 July 2004 (29.07.2004)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2003-0052422 29 July 2003 (29.07.2003) KR

(71) Applicants (for all designated States except US):
LG CHEM, LTD. [KR/KR]; LG Twin Towers, 20,
Yeouido-dong, Yeongdeungpo-gu, Seoul 150-721 (KR).
**KANGWON NATIONAL UNIVERSITY INDUSTRY
COOPERATION FOUNDATION** [KR/KR]; 192-1,
Hyoja 2-dong, Chuncheon-si, Gangwon-do 200-701 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LEE, Sung-Man**

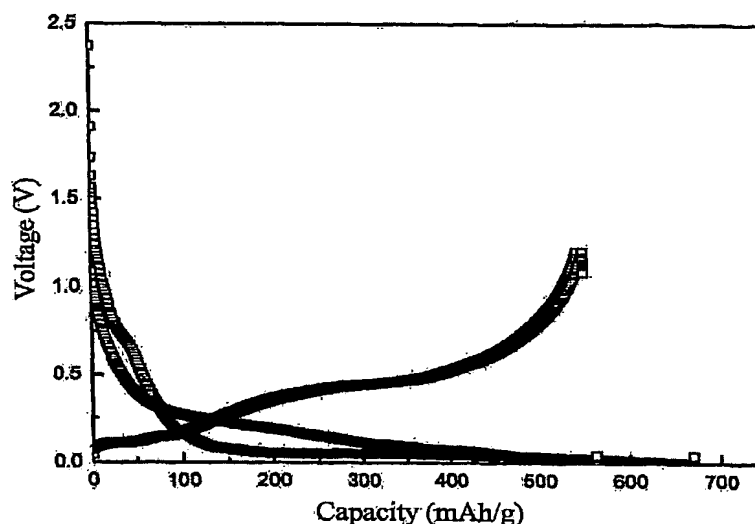
[KR/KR]; 106-303, Green Town Apt., Toegye-dong,
Chuncheon-si, Gangwon-do 200-752 (KR). **LEE, Heon
Young** [KR/KR]; Department of Advanced Materials Sci-
ence and Engineering, College of Engineering, Kangwon
National University, 192-1 Hyoja 2-dong, Chuncheon-si,
Gangwon-do 200-092 (KR). **HONG, Moon Ki** [KR/KR];
Department of Advanced Materials Science and Engineer-
ing, College of Engineering, Kangwon National University,
192-1 Hyoja 2-dong, Chuncheon-si, Gangwon-do 200-092
(KR).

(74) Agent: **SOHN, Chang Kyu**; 4F., Halla Bldg., 641-17 Yok-
sam-dong, Kangnam-gu, Seoul 135-080 (KR).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,
MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH,
PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: A NEGATIVE ACTIVE MATERIAL FOR LITHIUM SECONDARY BATTERY AND A METHOD FOR PREPARING SAME



(57) Abstract: Provided are an anode active material for a lithium secondary battery having high reversible capacity and excellent charge/discharge efficiency, comprising a complex composed of ultra-fine Si phase particles and an oxide surrounding the ultra-fine Si phase particles, and a carbon material; and a method for preparing the same. The present invention also provides a method for preparing an anode active material for a lithium secondary battery comprising producing a complex composed of ultra-fine Si particles and an oxide surrounding the ultra-fine Si particles by mixing a silicon oxide and a material having an absolute value of oxide formation enthalpy (ΔH_{for}) greater than that of the silicon oxide and negative oxide formation enthalpy by a mechanochemical process or subjecting them to a thermochemical reaction to reduce the silicon oxide; and mixing the Si phase-containing oxide complex and carbon material.



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*